Thermovision in Arctic

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Thermography in Arctic

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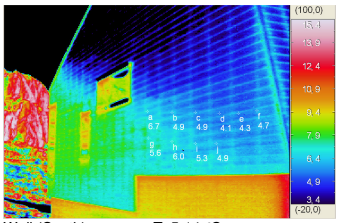
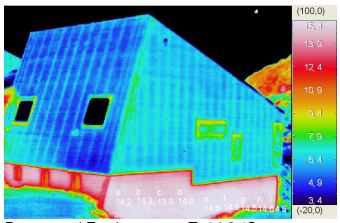
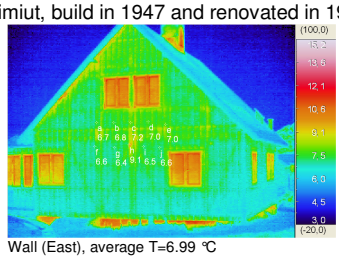
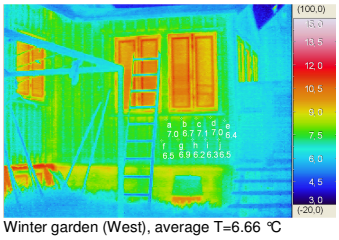
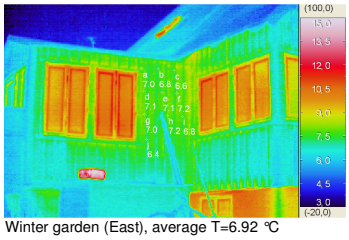
Matrix method is to define a matrix consisting of 10 points (a-j) on the wall surface and obtaining the average, min & max temperature and the temperature difference of the surface which depends on the emissivity of a material. Emissivity ε_{wood} = 0.95, $\varepsilon_{concrete}$ = 0.94.

1.LOW ENERGY HOUSE, Sisimiut, build in 2005

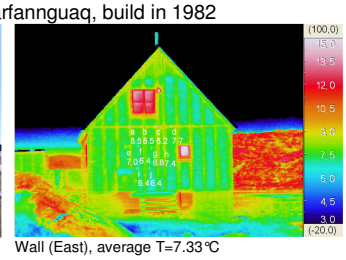
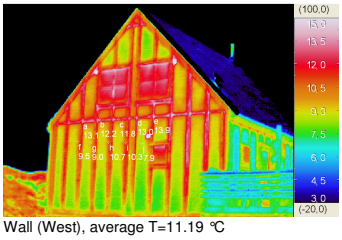
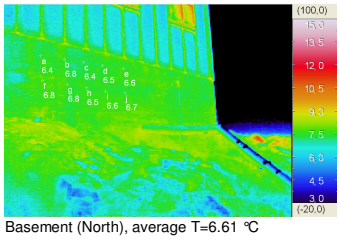


Wall (East), average T=5.04 ℃

Wall (South), average T=5.14 ℃

Basement (East), average T=14.8 ℃

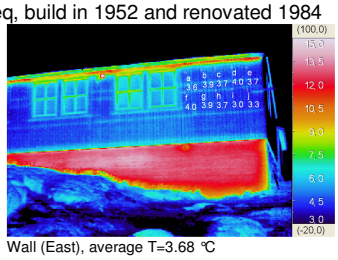
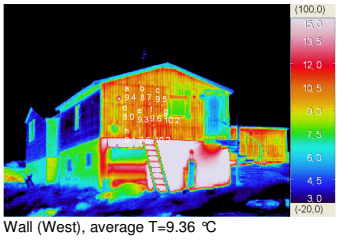
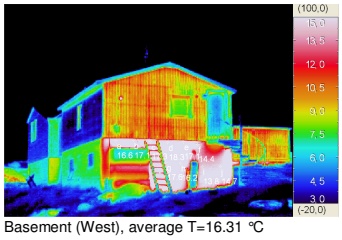
2.SINGLE FAMILY HOUSE, Sisimiut, build in 1947 and renovated in 1989



Wall (East), average T=6.99 ℃

Winter garden (West), average T=6.66 ℃

Winter garden (East), average T=6.92 ℃

3.SINGLE FAMILY HOUSE, Sarfannguaq, build in 1982



Wall (East), average T=7.33℃

Wall (West), average T=11.19 ℃

Basement (North), average T=6.61 ℃

4.ELEMENTARY SCHOOL, Itilleq, build in 1952 and renovated 1984



Wall (East), average T=3.68 ℃

Wall (West), average T=9.36 ℃

Basement (West), average T=16.31 ℃

Building	Insulation thickness [mm]	Average T [℃]	ΔT [℃]	Results
1.LEH, Sisimiut	Wall: 300 mm	4.95 - 5.01	1.7	Homogeneous wall where the temperature field is very uniform.
2.SF, Sisimiut	Wall: 175 mm Winter garden: 50 mm	6.2 - 9.1	2.9	More insulation and better windows. Problem: joint part of house and winter garden.
3.SF, Sarfannguaq	Wall: 150 mm	5.7 - 13.9 (West: 7.9 - 13.9)	3.4 (6.0)	Insulate walls and basement walls, with special focus on west side of house.
4.ES, Itilleq	Wall = 130 mm	3.0 - 10.2 (West: 8.2 - 10.2)	7.2 (2.0)	Complaints: cold air through basement. Insulate basement and close exhaust holes.

Conclusion: The matrix method represents a simple method for the evaluation of current state of buildings in Sisimiut, Greenland, to determine the situation of walls or thermal insulation (thermal bridges, connection points, exhaust ventilation, etc.)

More results upon request in the report: “Arctic field work in building technology”.

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